

## Abstract

Novel nanowell microarrays are disclosed in optical contact with polymer waveguides wherein evanescent field associated with lightwaves propagated in the waveguide excite target substances in the nanowells either by a common waveguide or by individual waveguides. Fluid samples are conveyed to the nanowells by means of microfluidics. The presence of the target substances in fluid samples is detected by sensing fluorescent radiation generated by fluorescent tag bound to the target substances. The fluorescent tags generate fluorescent radiation as a result of their excitation by the evanescent field. One or more PMT detectors or a CCD detector are located at the side of the waveguide opposite to the nanowells. Fluorescent radiation is detected due to its coupling with the waveguide or its emission through the waveguide..